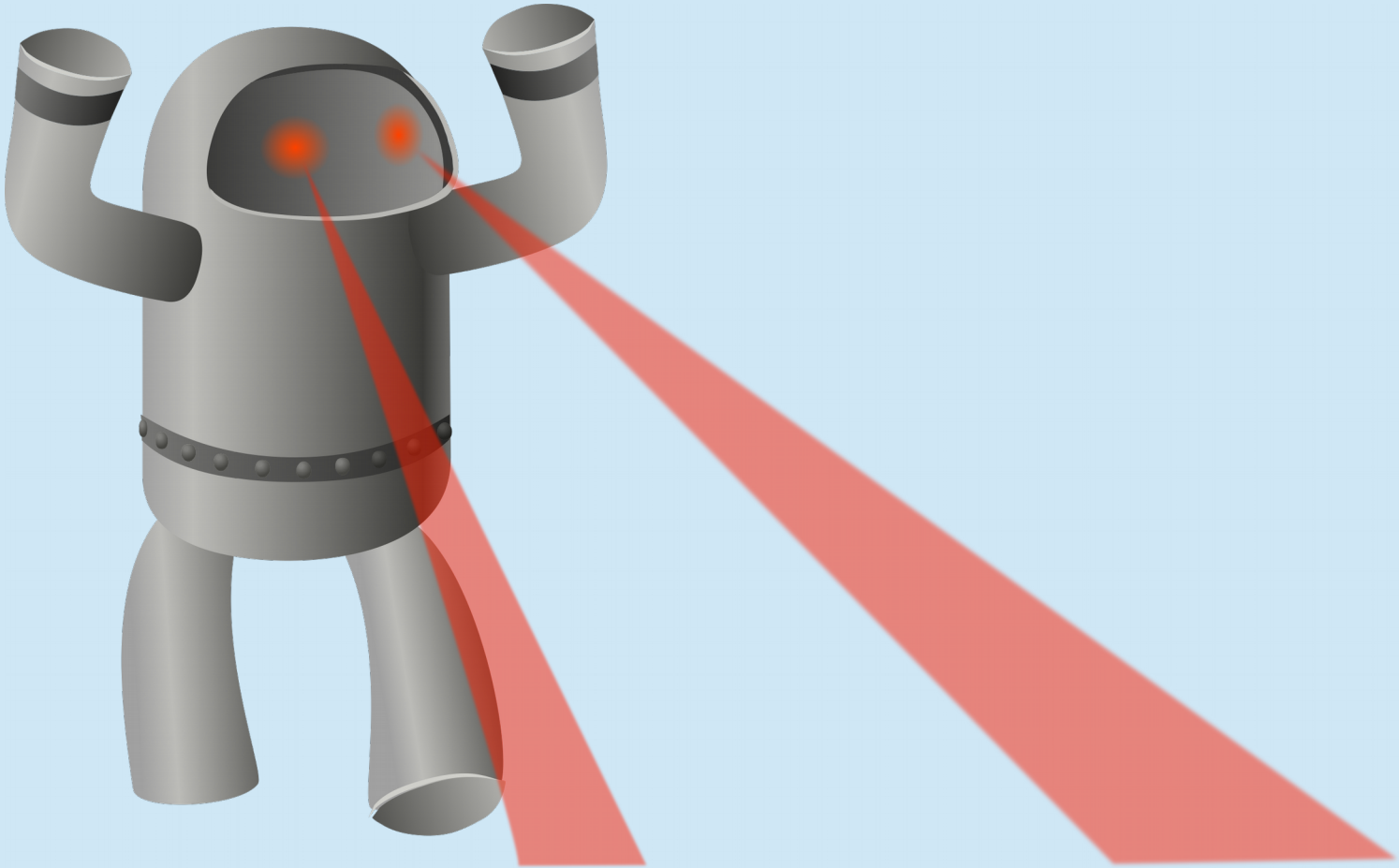
Technology Overload:

How makerspaces and libraries can save classrooms from pervasive tech run amok



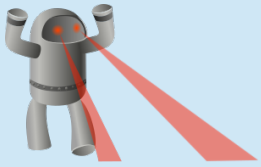
Robinson Tryon
SCALE 15x
March 5th, 2017
Pasadena, CA

Robinson Tryon

- Over a decade of experience in Free/Open Source Software (FOSS)
- Currently Director of Open Source Strategy for the LOT Network, Inc
- QA Engineer for The Document Foundation
  - LibreOffice, Document Liberation Project
  - Community outreach & education
- Technical Consultant at Tiltfactor Game Lab, Dartmouth College
  - Metadata Games, crowdsourcing metadata for libraries & archives
- Senior Developer at Interactive Media Lab, Geisel School of Medicine
  - Training programs for doctors and first responders
- Regular speaker at FOSS & Tech conferences in US and Europe
- BA in Computer Science from Dartmouth College
- Based in Dallas, Texas

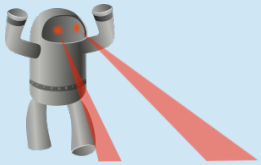
On the syllabus for today

- Identify the problems with tech in schools
- Determine a solution to these problems
  - (Makerspaces, libraries, and generous helping of brainpower from y'all)
- Praise people who are "getting it right"
- Opine about the future of education

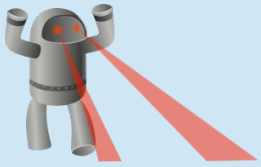


Have suggestions? Better ideas?

- I’m interested in hearing from y’all
- Feel free to raise your hand or throw something (soft) at me
- If you’re shy, feel free to come chat after the talk

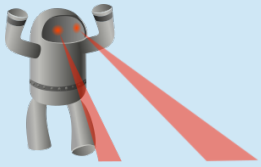


Where are we with tech in schools today?



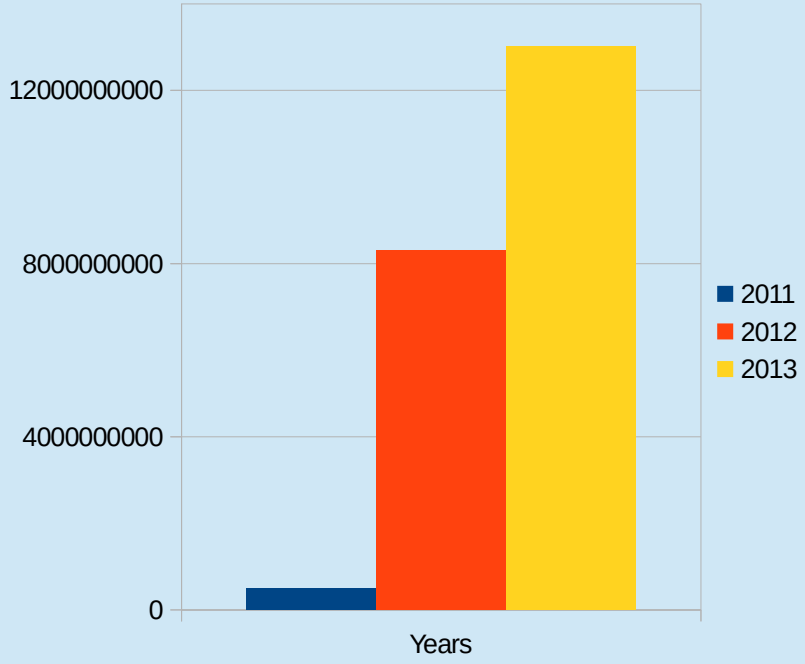
Major disconnect

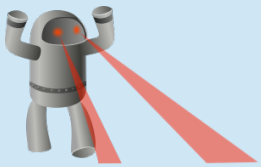
- 2013: Los Angeles tried to roll out $1.3 billion of iPads loaded with Pearson digital content
- 2015: In addition to other problems, the iPads were *unusable*
- The district complained to Apple and asked for a refund, *“citing crippling technical issues with the Pearson platform and incomplete curriculum that made it nearly impossible for teachers to teach.”*



Schools are overwhelmed by technology companies

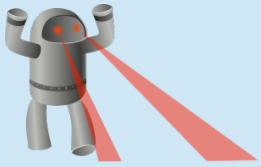
- EdTech is a booming business
- Spending exploded 1600% from $500 million in 2011 to a whopping $8.38 billion in 2012
- Up to $13 billion in 2013
- Can districts negotiate on the same level as big EdTech businesses?





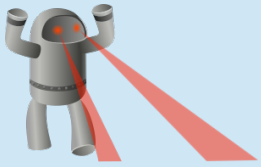
Schools are overwhelmed with technology

- Technology is advancing faster than schools can usefully apply it
- Student's personal devices (phones, tablets) are frequently more powerful than the technology deployed in classrooms
  - In a few cases, older tech can be a big benefit!



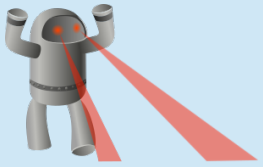
Older tech is better tech?

- Simpler tech == easier to focus on lesson
- No Internet? No distractions
- An Apple IIe is just as good for teaching touch-typing as it was 30 years ago
- An iPad is not (even with a keyboard)



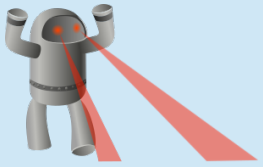
Technology Problems in Education

- A couple of years ago
- Visiting Ashland, Oregon
- Spoke to primary school teacher about computer-based tests
- Some students didn't have access to computers at home – she had to teach them the basics of using a computer *just* so that they could complete a test
- Disconnect between administration and the classroom



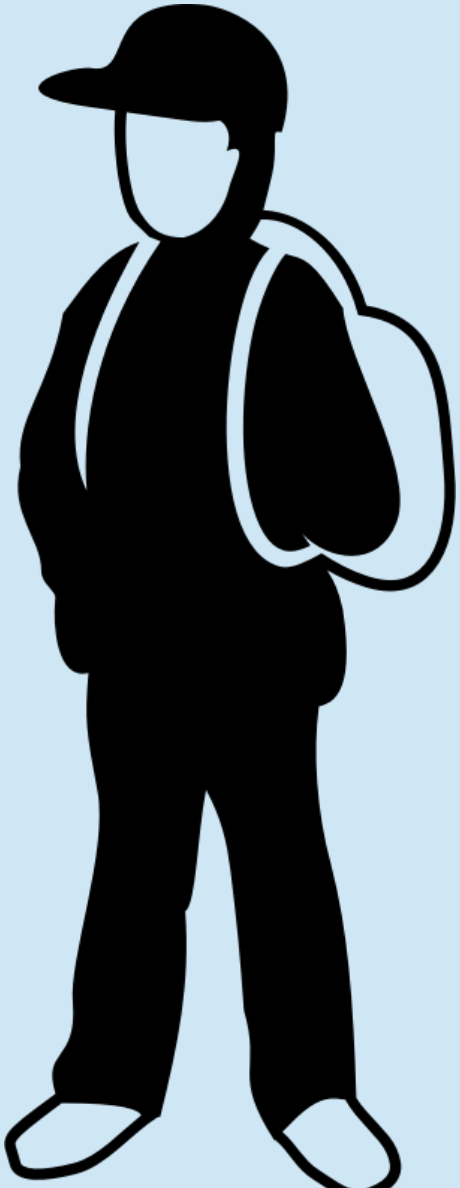
Digital Divide

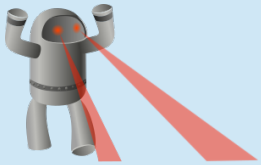
- Increasing number of households connect to Internet via mobile phones
  - Not a replacement for laptops/desktops
- A 2015 report from the Pew Research Center noted: *“Nearly half of smartphone job seekers have had problems accessing job-related content because it wasn’t displaying properly on their phone or had difficulty reading the text in a job posting because it was not designed for a mobile device”*



Is technology improving education for students?

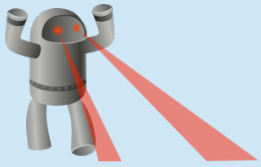
- Miracle of “paperless” office
- Miracle of “paperless” classroom?
- I know a kid in 5th grade. Uses iPad extensively in school, but still drags around a 25lb backpack
  - And that’s in addition to carrying around an iPad, keyboard, & charger





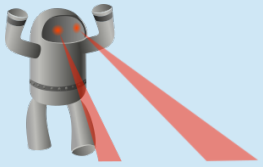
Kids need to be able to make mistakes

- When I was 12, my sister changed all the window chrome, etc.. on home computer white
- It was nearly impossible to see what you were clicking on
- Consequence: She had to figure out how to fix it
  - Students learn by making mistakes and fixing them



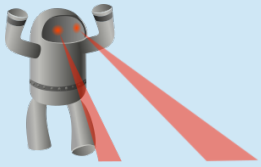
Tablets: What message do they send to kids?

- Tablets: They're an impenetrable brick
- iPad: Not only is the hardware impervious to examination and exploration, *the software itself* is locked down
- Even with a parent or educator's consent, student's can't write their own programs or modify most aspects of the computer
  - Students are never able to exercise ownership decisions, make mistakes, and then (most importantly) *correct* them



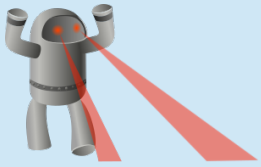
US Rankings vs. The World

- As of 2012, the US ranked 35th out of 64 countries in math and 27th in science (PISA)
- Our scores haven't improved much in later years
- In Finland, schools *banish smartphones* at the beginning of the school day and employ graph paper and chalkboards to teach math.
  - As of 2015, Finnish kids (age 15) are ranked 6th in the world in math & science
  - In Finland "Education isn't a competition," says the Counselor of Education



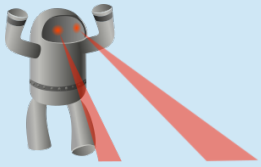
Teachers & Tech

- Inundated w/tech that they can't use
  - *"[T]he utopian hype of technophiles who convince teachers that a SmartBoard will cure leprosy and an iPod will turn water into wine"*
    - *John Spencer*
- Enthusiastic about trying new tech, but wary about who is pitching it
  - In a survey of 700 teachers, *"fully 40 percent said they distrusted information from ed-tech companies"*



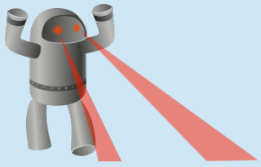
Some teachers want to teach without technology

- Permitted?
  - Great success in Finland
- EdWeek study notes *“many teachers…rely on digital programs to supplement traditional instructional strategies”*
- Barriers to do so?
  - Requirements set by administration
  - Learning Management System (LMS) dependencies

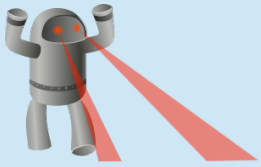


Teachers aren’t technologists

- Friend in Massachusetts who is a language teacher
- She would like to better-understand technology, but doesn’t have unlimited time to dedicate to learning about it
- Solution? Tech staff who support the classroom
- Knowledgeable staff who understand what’s going on and can advocate for teachers, not blindly carry out the will of the administration are hard to find...

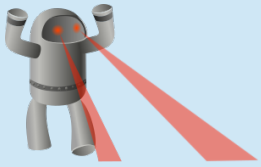


Schools are Restrictive



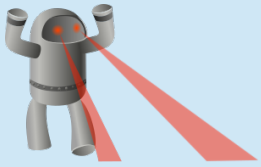
Not allowed at school

- What content isn’t allowed at school?
  - Filtering
  - Schoolboard-mandated policies on science and health?
- Restrictions on devices
- Lockdown of school-provided hardware and software



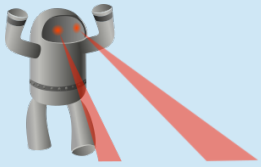
Intelligent use of tech in Edu

- Penn Manor School District
- 1-to-1 GNU/Linux laptop program
- Hands-on involvement of high school students in deployment, writing cloning/imaging software, etc
- Possible for students to install software, write code, and even install new OS
- Tech serves dual role:
  - Means to an end; tool for education
  - Direct, hands-on laboratory for understanding computing



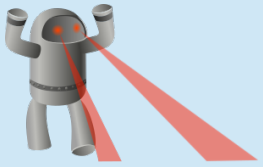
Schools: Hands are tied

- Often *legally bound* to filter content on computers
  - CIPA requires schools (and libraries) to block/filter “obscene or harmful content” online
  - Federal law
- How is this enforced? Lock Down Everything!
  - For a time, even LGBT-related sites were blocked
- Even in a very FOSS-friendly environment, we still need external, unencumbered outlets for children to be creative

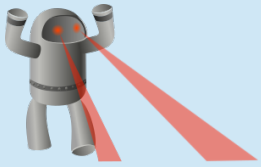


Effects of filtering?

- Keith Krueger, CEO of a professional group for school tech directors:
  “Without question, students need to become digitally literate (having the knowledge and ability to use information and technology for varied purposes) because ultimately they live in an unfiltered *world.”*
- Even in a very FOSS-friendly environment, we still need external, unencumbered outlets for children to be creative

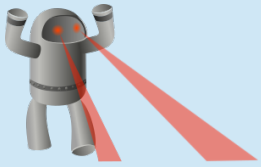


What problems can makerspaces solve?



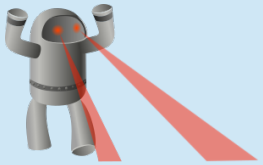
Freedom!

- No content restrictions
- No mandate from separate administration(s)
- Fund what's interesting to the community
- Do just about anything that's legal
  - Flamethrowers?
  - High-powered lasers?
  - Trebuchets?



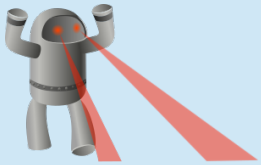
Collaborate with everyone

- Not tied to your age group
- Explore topics at your own pace
- Use tools and materials not available at school
- Engage in longer-term projects (not limited to a term or school year)



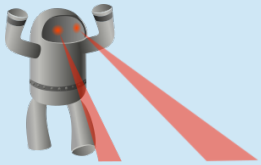
Parents & Makerspaces

- Many parents are not very tech-savvy
- How many clocks in your parents house are still blinking **12:00**?
- Makerspaces: encourage parents to become more comfortable with technology
- Collaborate on projects with their children
- Access to equipment, materials, and instruction

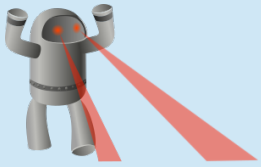


Parents & Makerspaces

- Lectures & demos about security, privacy, & policy
- Notification about local events like SCALE
- Structured peer group for dealing with technology

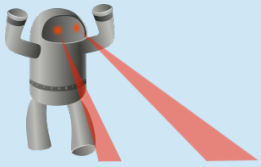


Limitations of makerspaces?



Makerspaces: Elites only?

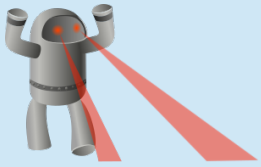
- Many makerspaces are age-limited
  - Plano: Must be 18+ to be a member
  - Dallas: Close supervision required for those < 16
  - ADX PDX: Waiver for ages 16-17
- Some are *specifically* geared towards children or teens
  - Rockwood Lab for Teens



Rockwood Lab for Teens:

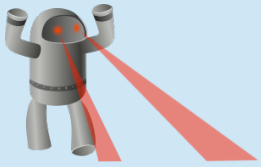
Multnomah County Library Makerspace

- 1000 sq ft makerspace inside library branch
- Exclusively for grades 6 – 12
- Free programs
- Offers volunteer opportunities for teens and adults



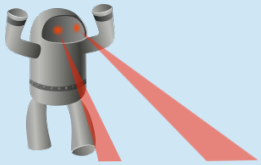
Makerspaces: Expensive?

- Monthly membership fees can be cost-prohibitive for many
  - Dallas: $50
  - Plano: $30
  - ATX HS: $95
  - Rockwood (Library): free



Makerspaces: Car required?

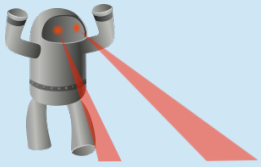
- What transportation do you have to take to get to a makerspace?
- How much *free time* do you have to go there?
  - What about teens who have family responsibilities or work part-time?



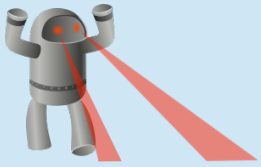
Makerspaces + Libraries:

Best solution to Tech in Edu so far

- Not perfect
- Scholarships & Transportation options needed
- Increase membership & open more physical locations

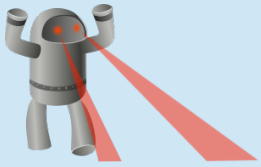


But EduTech isn’t the only technology deployed in schools...



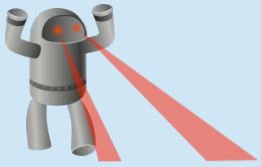
Tracking students with RFID

- Not a hypothetical: Districts are actively tracking students
- Using RFID tags, students are monitored in real-time
- One Texas student was *suspended* for refusing to be tracked



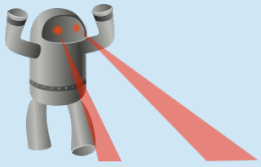
Tracking students with RFID

- Some schools recently abandoning tracking
- 2014: Missouri prevents schools from requiring RFID trackers
  - First state to pass legislation
- 2015: Texas introduces bill SB486
  - *“A school district may not require a student to use an identification device that uses active radio frequency identification technology or similar technology to identify the student, transmit information regarding the student, or track the location of the student”*



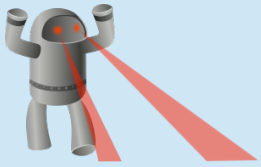
Tracking & Surveillance at Home?

- “WebcamGate” scandal
- Schools secretly activated webcams in school-issued laptops
- Monitored student activity at home
  - Took screenshots & webcam pictures
  - Recorded websites visited
  - Stored chat logs
- Disciplined students using this evidence



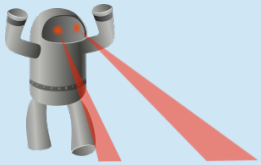
WebcamGate: Why would students ever trust authority again?

- Students raised concerns about technology
  - LANrev software could be used for remote monitoring
  - Webcam lights would sometimes flicker on
  - Asked that students & parents be warned about possible surveillance and informed about policy
- Concerns were dismissed, laughed-off
- District Director of Technology stated *"[T]here is absolutely no way that the District Tech people are going to monitor students at home"*

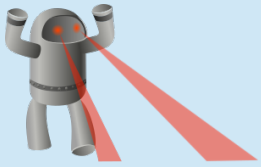


WebcamGate:

- U.S. Senate Judiciary subcommittee held hearings about the issue
- Legislation introduced in the Senate to avoid similar intrusions in the future
- Those responsible: No jail time?

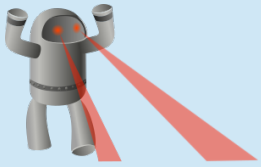


How did we get here?



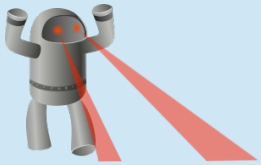
Why has tech in schools run amok?

- Parents aren't equipped to understand or comment on current technology
- "Ignorance is bliss" culture?
  - Two Pokemon Go addicts fell off a **90 foot cliff** because they weren't paying attention to where they were going

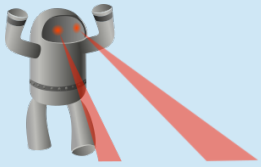


Physics Teachers have been nerfed

- When I was in high school, my physics teacher brought his potato canon to school
- Chances of that happening today?
- For some reason, students love food ballistics
  - (This should be a talk all by itself!)

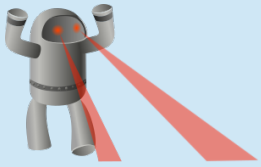


Other science/tech-friendly places



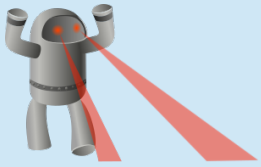
Free Geek

- Close to where I grew up
- In the past I've joked: *"I might not have graduated from high school if it'd been there when I was younger."*
  - Reality: I might have gotten involved in CS and hardware at a much younger age
- Community that teaches about tech, provides opportunities to volunteer with tech, fixing tech, building things, disassembling tech, etc.

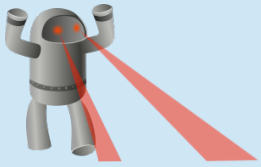


OMSI

- Oregon Museum of Science & Industry
  - Anyone remember when it was up next to the Zoo?
- They had a station for kids where you could take apart broken machines
  - I took apart VCRs, gas meters, clocks, etc..
- My start in the “maker” community

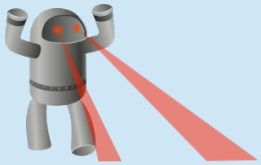


Future of Education & Challenges we may face



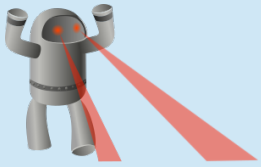
Political challenges?

- Expectations in education during the next few years?
- Will we see more restrictions enforced?
- Will we see a loosening of federal & state policy?



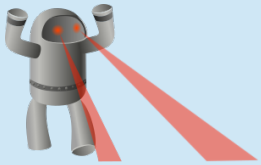
School Administration/ Schoolboard?

- Will they eventually agree with us on tech and tech-related topics (security, privacy, hands-on exploration & (good) “hacking” of tech?)
- Will they continue to be influenced/manipulated by profit-focused companies in EduTech?

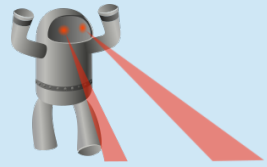


Makerspaces:
Down here, it's our time

- Creativity needs space in which to perform
- Regardless of what restrictions exist in schools, hackers and tinkerers can come together and collaborate externally
- Whether you're an explorer like Chester Copperpot or a mad scientist like Data, you need your freedom

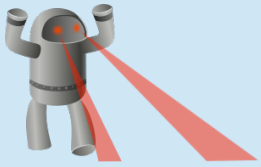


Is it all a moot point?



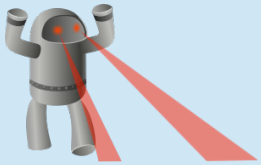
In the end...

- The reality is that neither makerspaces, nor libraries, nor the smartest Musk-Tyson-Nye scientific hybrid child is going to solve our tech issues
- Eventually intelligent machines will rise to meet us, and educate us, and give us exactly the background we need to comprehend the world



Intelligent machines

- But at that point, what will *we* really need to understand?
- There will likely be future challenges for us at that point, but they’re beyond what we can comprehend today
- Until then, we need to continue to provide more freedom to our students



Questions?

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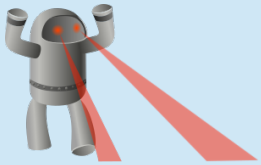

Images & Video

- Rampaging robot – *public domain* – anarres
  https://openclipart.org/detail/208615/rampaging-robot
- Another fire flame – *public domain* – ginkgo
  https://openclipart.org/detail/249612/another-fire-flame
- Calico Jack pirate logo – *public domain* – clue
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- Simple schoolkid outline – *public domain* – devrnd
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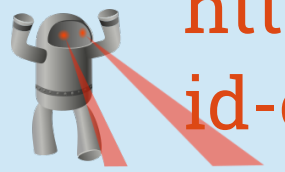

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